

Translated English of Chinese Standard: QC/T1128-2019

www.ChineseStandard.net → Buy True-PDF → Auto-delivery.

Sales@ChineseStandard.net

QC

AUTOMOBILE INDUSTRY STANDARD
OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 43.040.10

T 36

QC/T 1128-2019

Automotive Camera

汽车摄像头

Issued on: November 11, 2019

Implemented on: April 01, 2020

Issued by: Ministry of Industry and Information Technology of PRC

Annex:

39 automotive industry standard numbers, standard names and implementation dates

No.	Standard number	Standard name	Replaced standard number	Date of implementation
33	QC/T 826-2019	Bridge inspection vehicle	QC/T 826-2010	2020-04-01
34	QC/T 1107-2019	Compression garbage truck		2020-04-01
35	QC/T 53-2019	Fecal suction truck	QC/T 53-2006	2020-04-01
36	QC/T 1108-2019	Pneumatic solenoid valve for commercial vehicles		2020-04-01
37	QC/T 708-2019	Automotive air conditioning fan	QC/T 708-2004 QC/T 29092-1992	2020-04-01
38	QC/T 1109-2019	Dimming motor for automotive front lighting		2020-04-01
39	QC/T 829-2019	Technical requirements for diesel vehicle exhaust aftertreatment system	QC/T 829-2010	2020-04-01
40	QC/T 1110-2019	Fuel heating device for automobile diesel engine		2020-04-01
41	QC/T 1113-2019	Technical requirements and test methods for quick-plug connectors for automobile pneumatic brake systems		2020-04-01
42	QC/T 29082-2019	Technical conditions of automobile drive shaft assembly and bench test method	QC/T 29082-1992 QC/T 523-1999	2020-04-01
43	QC/T 1114-2019	Technical conditions and bench test methods for automobile's mechanical automatic transmission (AMT) assembly		2020-04-01
44	QC/T 568-2019	Technical conditions and bench test methods of automobile mechanical transmission assembly	QC/T 568.1-2011 QC/T 29063.1-2011	2020-04-01
45	QC/T 1115-2019	Technical requirements and test methods of automatic transmission (AT)		2020-04-01
46	QC/T 216-2019	Car carpet	QC/T 216-1996	2020-04-01
47	QC/T 1116-2019	Dust suppression vehicle		2020-04-01
48	QC/T 1117-2019	Animal and poultry harmless transport vehicles		2020-04-01
49	QC/T 453-2019	Van transport truck	QC/T 453-2002	2020-04-01
50	QC/T 447-2019	Construction slab transport truck	QC/T 447-1999	2020-04-01
51	QC/T 1118-2019	Technical requirements for van exchange box		2020-04-01
52	QC/T 1121-2019	Plastic fuel tanks for automobiles		2020-04-01
53	QC/T 1122-2019	Technical requirements of electric water pump for automobile engine		2020-04-01
54	QC/T 626-2019	Automotive window regulator	QC/T 626-2008 QC/T 636-2014	2020-04-01

Table of Contents

Foreword.....	7
1 Scope.....	8
2 Normative References	8
3 Terms and Definitions	9
4 Abbreviations	12
5 Requirements	12
6 Test Method	23
7 Inspection Rules	43
8 Marking, Packaging, Transportation and Storage	44
Appendix A (Informative) Calculation Module of Durability Test	46

Automotive Camera

1 Scope

This Standard specifies the requirements, test methods, marking, packaging, transportation, and storage of automotive camera products.

This Standard is applicable to camera products based on visible light imaging technology (hereinafter referred to as product).

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 1865-2009 Paints and Varnishes - Artificial Weathering and Exposure to Artificial Radiation - Exposure to Filtered Xenon-Arc Radiation

GB/T 2423.22 Environmental Testing for Electric and Electronic Products - Part 2: Test Methods - Test N: Change of Temperature

GB/T 2828.1 Sampling Procedures for Inspection by Attribute - Part1: Sampling Schemes Indexed by Acceptance Quality Limit (AQL) for Lot-by-Lot Inspection

GB/T 18655-2018 Vehicles, Boats and Internal Combustion Engines - Radio Disturbance Characteristics - Limits and Methods of Measurement for the Protection of on-Board Receivers

GB/T 19894 Digital Still - Picture Cameras - Methods for Measuring Opto-Electronic Conversion Functions (OECFs)

GB/T 19951-2010 Road Vehicles - Disturbances Test Methods for Electrical/Electronic Component from Electrostatic Discharge

GB/T 21437.2-2008 Road Vehicles - Electrical Disturbances from Conduction and Coupling - Part 2: Electrical Transient Conduction along Supply Lines only

GB/T 21437.3-2012 Road Vehicles - Electrical Disturbances from Conduction and Coupling - Part 3: Electrical Transient Transmission by Capacitive and Inductive Coupling via Lines other than Supply Lines

3.10 Field viewing angle

In the camera equipment, taking the lens centre of the camera equipment as the vertex, the object image of the measured target can pass through the angle formed by the two edges of the maximum range of the lens.

3.11 Optical axis centre precision

The deviation between the actual imaging centre of the camera equipment and the theoretical centre of optical imaging.

3.12 Automatic gain control

An automatic control method in which the gain of the amplifying circuit is automatically adjusted with the signal strength.

3.13 White balance

The image restoration of the photographed object under lighting conditions of different light sources by the photographic imaging equipment shall have a colour reproduction consistent with the human eye observing the photographed object under the same lighting conditions.

3.14 Glare

Visual conditions, due to the unsuitable brightness distribution in the visual field, there is an extreme brightness contrast in space or time, which causes visual discomfort and reduce the visibility of objects.

3.15 Colour rendition

The image data describing the colour space coordinates of the scene is mapped to the image data describing the colour space coordinates of the photo related to the output.

NOTE: Colour rendition usually consists of one or more compensations for the difference between input and output observation conditions. Therefore, the scale and colour gamut that describe the colour of the scene shall be mapped to the dynamic range and colour gamut of the photo, and use preference adjustment. Simply put, it is the ability of the imaging device to truly reproduce the colour of the subject.

3.16 Ghost

The high-brightness target source existing in the environment quickly reflects inside the lens, and finally forms an additional image on the image.

Macbeth 24-color test chart shall have no obvious colour difference, and the image shall have no colour cast. The colour saturation (S) in the grey scale HSV of #21, #22 two blocks (in the middle) of the 24-color test chart shall be less than 15%.

NOTE: Gretag Macbeth colour test chart is the goods name of the test chart provided by Gretag Macbeth company. This information is given for recommendation to users of this Standard; and does not mean that the product is approved. For the test chart recommended in the follow-up of this Standard, if other products can have the same effect, these equivalent products can be used.

5.2.12 Start time

Carry out the test according to 6.3.2.12, the measured value shall be no greater than 1s.

5.2.13 System delay

Carry out the test according to 6.3.2.13, the actual measured value shall be no greater than 100ms.

5.2.14 Colour rendition

The colour rendition is based on the CIE 1976 chromaticity space hue angle ¹⁾. Carry out the test according to 6.3.2.14. The Euclidean distance of the measured chromaticity error between each colour block and the white block shall be no less than 0.02.

The hue angle shall meet the following requirements:

- a) The coordinates of the red block shall be within the range of (0°, 44.8°) or (332.2°, 360°);
- b) The coordinates of the green block shall be within the range of (96.6°, 179.9°);
- c) The coordinates of the blue block shall be within the range of (209.9°, 302.2°);
- d) The coordinates of the yellow block shall be within the range of (44.8°, 96.6°).

5.2.15 Glare

Carry out the test according to 6.3.2.15; and the spot area of the lens generated by the test light shall be no greater than 25% of the display area.

5.2.16 Ghost

Carry out the test according to 6.3.2.16; and the area ratio of the ghost to the field of

¹⁾ The International Commission on Illumination. Its hue angle can refer to chromaticity diagram of CIE 1976 UCS.

5.3.3 Superimposed AC voltage

Carry out the test according to 6.4.3; and the subjective image quality assessment shall be no less than 4 scores.

Products whose U_N is 5V is not subject to this requirement.

5.3.4 Slow drop and rise of supply voltage

Carry out the test according to 6.4.4; when the voltage is within $U_{Smin} \sim U_{Smax}$, the subjective image quality assessment shall be no less than 4 scores.

5.3.5 Slow drop and fast rise of supply voltage

Carry out the test according to 6.4.5; when the voltage is within $U_{Smin} \sim U_{Smax}$, the subjective image quality assessment shall be no less than 4 scores.

5.3.6 Transient changes of supply voltage

5.3.6.1 Instantaneous voltage drop

Carry out the test according to 6.4.6.1; the subjective image quality assessment shall be no less than 3 scores.

Product whose U_N is 5V is not subject to this requirement.

5.3.6.2 Reset performance against voltage dips

Carry out the test according to 6.4.6.2; after the voltage is restored to U_{Smin} , the subjective image quality assessment shall be no less than 4 scores.

5.3.6.3 Start-up characteristics

Carry out the test according to 6.4.6.3; and the subjective image quality assessment shall be no less than 3 scores.

Product whose U_N is 5V is not subject to this requirement.

5.3.7 Reverse voltage

Carry out the test according to 6.4.7; and the subjective image quality assessment shall be no less than 4 scores.

5.3.8 Short-term interruption of power supply

Carry out the test according to 6.4.8; when the interruption time does not exceed 100us, the subjective image quality assessment shall be no less than 4 scores; when the power supply interruption time exceeds 100us and does not exceed 2s, the subjective image quality assessment shall be no less than 3 scores.

5.5.1 Mechanical vibration

Carry out the test according to 6.6.1; the product is not allowed to be damaged; the appearance and structure shall comply with the provisions of 5.1. The MTF value shall comply with the provisions of Table 3; and the subjective image quality assessment shall be no less than 4 scores.

5.5.2 Mechanical shock

Carry out the test according to 6.6.2; the product is not allowed to be damaged; the appearance and structure shall comply with the provisions of 5.1. The MTF value shall comply with the provisions of Table 3; and the subjective image quality assessment shall be no less than 4 scores.

5.5.3 Free fall

Carry out the test according to 6.6.3; the product is not allowed to be damaged; the appearance and structure shall comply with the provisions of 5.1. The MTF value shall comply with the provisions of Table 3; and the subjective image quality assessment shall be no less than 4 scores.

5.5.4 Gravel impact

Carry out the test according to 6.6.4. The lens installed on the exterior of the vehicle body shall not be broken (the coating layer on the lens surface is allowed to have slight damage that does not affect the image quality). The MTF value shall comply with the provisions of Table 3; and the subjective image quality assessment shall be no less than 4 scores.

5.5.5 Wear resistance of lens

Carry out the test according to 6.6.5; the coating layer is not allowed to fall off. The MTF value shall comply with the provisions of Table 3; and the subjective image quality assessment shall be no less than 4 scores.

5.5.6 Harness pull-off force

Carry out the test according to 6.6.6. The product with the wiring harness shall not have damage, breakage of the harness, or terminal fall off; and the subjective image quality assessment shall be no less than 4 scores.

5.6 Environmental weatherability

5.6.1 Temperature and humidity range

The storage environment temperature range and working environment temperature and humidity range of the product shall comply with the provisions of Table 6.

shall be no less than 4 scores.

5.6.2.5 High and low temperature alternating

Carry out the test according to 6.7.1.5; and the subjective image quality assessment shall be no less than 4 scores.

5.6.3 Damp heat cycle

Carry out the test according to 6.7.2. The MTF value shall comply with the provisions of Table 3; and the subjective image quality assessment shall be no less than 4 scores.

5.6.4 Ice water shock

Carry out the test according to 6.7.3. The appearance of the product installed outside the vehicle body shall meet the requirements of 5.1.1; and the subjective image quality assessment shall be no less than 4 scores.

Product installed inside the vehicle body is not subject to this requirement.

5.6.5 Salt spray corrosion

Carry out the test according to 6.7.4; the appearance shall comply with the provisions of 5.1.1; and the subjective image quality assessment shall be no less than 4 scores.

5.6.6 Climate aging

Carry out the test according to 6.7.5. The surface coating (plating) layer of the product installed outside the vehicle body or installed in the direct sunlight high temperature area inside the vehicle body shall not be peeled off, cracked, bubbles, etc. (The appearance is allowed to have the slight loss of light and discoloration that does not affect the image quality); the subjective image quality assessment shall be no less than 4 scores.

The product installed in the direct sunlight high temperature area of the vehicle body is not subject to this requirement.

5.7 Chemical loading

Carry out the test according to 6.8; the appearance shall comply with the provisions of 5.1.1; and the subjective image quality assessment shall be no less than 4 scores.

5.8 Electromagnetic compatibility

5.8.1 Electrical disturbance caused by electrostatic discharge

5.8.1.1 DUT is powered off

greater than 10%

- d) The display ratio of the test chart in the field of view shall be no less than 90% (that is, the "full screen" state) is the test distance of the product.

6.1.2 Chart test rules

In the process of using the test chart to test various indicators for the objective evaluation of image quality, the arithmetic average of the 8 test values shall be taken as the final test result.

6.1.3 Test working mode

6.1.3.1 Working mode A (the test sample is not electrically connected)

Working mode A1: The test sample is powered off, and is not connected to the connector or harness.

Working mode A2: The test sample is powered off, and has been connected to the connector and harness.

6.1.3.2 Working mode B (the test sample is electrically connected)

Working mode B1: The test sample is electrically connected normally, all functions are operating normally, and an external display device is required.

Working mode B2: The test sample is electrically connected normally, and all functions are operating normally, but no external display device is required.

6.2 Appearance and structure inspection

6.2.1 Appearance

The DUT is visually inspected with a line-of-sight of about 300mm under the illumination condition of (800 ± 80) lx in working mode A1.

6.2.2 Structure

According to 6.2.1, take the visual inspection and hand feel inspection.

6.3 Image quality assessment

6.3.1 Subjective image quality assessment

When the image performance of the product cannot be objectively assessed in some tests, it can be assessed with reference to Section 4 Dual Excitation Damage Table (DSIS) of ITU-R³⁾ BT.500-13 (01/2012); the subjective image quality assessment can

³⁾ Radio Communication Department, International Telecommunication Union.

The DUT is tested at $T_{\max}$ and in working mode B1, and in accordance with the method of 5.1.2.2.2 in GB/T 28046.4-2011. After the test, stand for 2h to return to the normal temperature; check according to 6.2 and carry out test in working mode B1.

6.7.1.3 Temperature gradient

The DUT is tested in the range of $T_{\min} \sim T_{\max}$ and in working mode B1, and in accordance with the method of 5.2.2 in GB/T 28046.4-2011.

6.7.1.4 Temperature cycle

The DUT is tested in the range of $T_{\min} \sim T_{\max}$ and in working mode A1, and in accordance with the method of 5.3.2.2 in GB/T 28046.4-2011. After the test, stand for 2h to return to the normal temperature; and carry out the test in working mode B1.

6.7.1.5 High and low temperature alternating

The DUT is tested in the range of $T_{\min} \sim T_{\max}$ and in working mode A1, and in accordance with the method in GB/T 2423.22. After the test, stand for 2h to return to the normal temperature; and carry out the test in working mode B1.

6.7.2 Damp-heat cycle test

The DUT is tested in the working mode B1, and in accordance with the method of 5.6.2.2 in GB/T 28046.4-2011. After the test, stand for 2h to return to the normal temperature and carry out the test in the working mode B1.

6.7.3 Water splash test

The DUT is tested in the working mode A1, and in accordance with the method of 5.4.2.1 in GB/T 28046.4-2011. After the test, check according to 6.2.1, and carry out the test in working mode B1.

6.7.4 Salt spray corrosion test

The DUT is tested in the working mode A2, and in accordance with the method of 5.5.1.2 in GB/T 28046.4-2011. After the test, check according to 6.2.1, and carry out the test in working mode B1.

6.7.5 Climate aging test

For products installed outside the vehicle carriage, the DUT shall perform a 600h test in working mode A1 in accordance with Method 1 and Cycle B in table 3 of GB/T 1856-2009. After the test, check in accordance with 6.2.1 and test in working mode B1.

For products installed in the direct sunlight area inside the vehicle carriage, the DUT shall perform a 600h test in working mode A1 in accordance with Method 2 and Cycle D in Table 3 of GB/T 1865-2009. After the test, check in accordance with 6.2.1 and test

in working mode B1.

6.8 Chemical load test

For products installed outside the vehicle carriage, the DUT is tested in working mode A1 in accordance with Table 1 installation location code [D], selection of reagents and exposure conditions, as well as Table 2 wetting method and the procedure in 4.8 of GB/T 28046.5-2013. After the test, check in accordance with 6.2.1 and test in working mode B1.

For products installed in the passenger compartment, the DUT is tested in working mode A1 in accordance with Table 1 installation location code [B], selection of reagents and exposure conditions, as well as Table 2 wetting method and the procedure in 4.8 of GB/T 28046.5-2013. After the test, check in accordance with 6.2.1 and test in working mode B1.

6.9 Electromagnetic compatibility test

6.9.1 Electrical disturbance test caused by electrostatic discharge

6.9.1.1 DUT is powered-off

The DUT is tested in working mode A1 in accordance with the test voltage requirements for the category 1 test with severity level no less than L_3 in Tables C.1 and C.2 in Appendix C of GB/T 19951-2010 and the method in Clause 9. After the test, perform the test in the working mode B1.

6.9.1.2 DUT is powered-on

The DUT is tested in working mode B1 in accordance with the test voltage requirements for the category 1 test with severity level no less than L_3 in Tables C.1, C.2 and C.3 in Appendix C of GB/T 19951-2010 and the method in Clause 8.

6.9.2 Electrical disturbance test caused by conduction and coupling

6.9.2.1 Electrical transient immunity along the power line

The DUT is tested in working mode B1 according to the immunity test level in Table 7 and the method in 5.8 of GB 34660-2017.

6.9.2.2 Electrical transient immunity through the capacitive and inductive coupling of the conductors other than power lines

The DUT is tested in working mode B1 in accordance with the requirements of CCC mode and Level-III in Tables B.1 and B.2 of GB/T 21437.3-2012 and the method of 3.4.2.

6.9.3 Immunity test for electromagnetic radiation

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

----- The End -----